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Release and permeation profiles of spray-dried chitosan microparticles containing caffeic acid

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Abstract

Caffeic acid (CA), a phenolic compound found in plants with antioxidant and antimicrobial activity, induces collagen production and prevents premature aging of the skin. The objective of this study was to develop two types of chitosan microparticles (MP) containing CA and to relate the morphology with the release and permeation profiles. One type of MP was prepared from a hydroalcoholic solution (MPI) and the other from an aqueous solution (MPII). Their morphology and size was evaluated by high-resolution scanning electron microscopy. The release profile of CA was evaluated using the cellulose membrane from the two MPs in Franz diffusion cells and the permeation profile was evaluated using human abdominal skin samples; the epidermal membranes were prepared by the heat-separation technique. MPII was spherical with a smooth surface, suitable for the controlled release of substances, whereas MPI was porous with non-internalized residual material. This result was consistent with their release and permeation profiles because MPII exhibited a slower and more controlled release than MPI. Thus, the method of preparation of MP and their composition influence the release profile of CA. Therefore, the production conditions must be closely controlled.

Keywords: Caffeic acid, Chitosan microparticles, Spray-dryer, Controlled release, Permeation.

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